Understanding the Drivers of Firm-level Stock Returns: An International Perspective

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Abstract

At social occasions, economists are often asked to interpret the movement of stock returns. In response, they have developed theories that break unexpected stock returns into changes in expectations of future cash flow and changes in expectations of future returns. Intuitively, one can call the former "news about future cash flow", or cash-flow news, and the latter "news about future returns", or expected-return news. It helps to understand how stock returns move to examine which news component is more important in terms of driving stock returns. By using US firms, researchers have empirically documented that cash-flow news dominates expected-return news in terms of explaining the variance of unexpected stock returns. However, little effort has been spent on understanding how the relative importance of these two news components varies with other economic factors, such as market opaqueness, financial market development, and investor protection. An international setting offers opportunities to understand the link between these country characteristics and the relative importance of news components. As a first step toward this goal, this paper uses the vector autoregressive model (VAR) developed by Campbell (1991) and Vuolteenaho (2002) to decompose firm-level stock returns for 29 countries around the world. By using a country-level earnings management measure developed by Leuz et al. (2003), we find

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that expected-return news is more important in driving unexpected stock return in countries where the earnings management is more extensive.

1 Introduction

The decomposition of unexpected firm-level stock-return variance is one way that economists explain why stock returns have changed the way that they have. In this model, the unexpected stock return changes because investors either change their expectations about future earnings or change their expectations about future returns. If we call the first component of the expectation-change "cash-flow news" and the second component "expected-return news"[1], we then decompose the unexpected stock returns into two components. By comparing the variances of these news components, economists can determine which component is more important in terms of driving the unexpected stock returns.

By using US data, Vuolteenaho (2002) documents that the cash-flow news dominates expected-return news in explaining the variance of unexpected firm-level stock returns. However, no study focuses on whether this is still true in other countries, or, more importantly, if results are different in other markets, what is driving the difference. Countries around the world differ in many interesting aspects, such as market opaqueness, financial market development, investor protection, origin of law, and so on. As a first step, our paper focuses on relation between the opaqueness of information environment across countries and changes in the relative importance of the two news components in terms of explaining unexpected stock returns. Opaqueness means a lack of information for investors to observe the true state of the firm and determine the firm's value. In a more opaque information environment, insiders of the firms may absorb part of the variation in the cash flow (see Jin and Myers (2006) for more details). If the variations in the riskiness of firms' projects stay the same, cash-flow news is less important relative to the expected-return news in an opaque information environment than in a transparent one.

[1] Also called "discount-rate news".

Our paper decomposes unexpected stock returns at firm level by estimating the vector autoregression (VAR) for 29 countries including the US. Consistent with Vuolteenaho (2002), we find that the cash-flow news dominates the expected-return news at the firm level in all countries. We then consider a measure of opaqueness constructed by Leuz et al. (2003), which measures the extent to which firms manage their earnings[2]. Based on this measure, we rank the 29 countries in our sample from high (opaque) to low (transparent) degree of earnings management. We find that in countries where earnings management is more extensive, there is less unexpected stock return variation at the firm level. We also find that the variance of cash flow significantly decreases with earnings management while the variance of the expected-return news and the correlation between two news components stay about the same across different countries. This result shows that variance of unexpected stock returns reduces because investors update their expectations of future cash flow less often in more opaque countries than in transparent countries, but not because investors update their expectations about future stock returns changes differently across countries. Furthermore, when we examine the relative importance of the two news components by using the ratio of expected-return-news variance to cash-flow-news variance, we observe that the expected-return news is more important in countries with more extensive earnings management, which is consistent with our prediction.

Our paper links to the growing literature that decomposes stock return volatility at the firm level as well as at the aggregate market level. Campbell and Shiller (1988a,b) model both cash-flow news and expected-return news directly. Campbell (1991) and Campbell and Ammer (1993) backs out the expected-return news from the VAR model first, and leaving cash-flow news in residuals of the model. Extending this residual-based method, Vuolteenaho (2002) uses the accounting clean surplus identity to decompose the stock returns at the firm-level. Campbell and Mei (1993) and Campbell and Vuolteenaho (2004) estimate the cash-flow betas. No study has explored the evidence of return decomposition in an international

[2]See Leuz et al. (2003) for details on how to construct this measure.

setting.

In what follows, Section 2 briefly describes the return decomposition methodology and the estimation technique used in this paper. Section 3 describes the data and the empirical results of return decomposition for the US as well as for other countries. Section 4 concludes that expected-return news is more important in driving unexpected stock return in countries where the earnings management is more extensive.

2 Methodology

2.1 Return decomposition

This section briefly describe the model that we use to decompose firm-level stock returns, which is the same model as in Vuolteenaho (2002). By assuming the accounting clean surplus identity[3], Vuolteenaho (2002) decomposes the unexpected log stock returns as follows:

$$r_t - E_{t-1}r_t = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(e_{t+j} - f_{t+j}\right) - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} + \kappa_t, \tag{1}$$

where,

Δ is the first difference operator, and ΔE_t means $E_t(.) - E_{t-1}(.)$.

$r_t = \log(1 + R_t + F_t) - f_t =$ The excess log stock return, where R_t is the simple excess stock return, F_t is the interest rate, f_t is log one plus the interest rate, $\log(1 + F_t)$.

$e_t = \log\left(1 + \dfrac{X_t}{B_{t-1}}\right)$, log generally-accepted-accounting-principles return-on-equity (ROE).

$\rho =$ the discount coefficient

$f_t = \log(1 + F_t) =$ log one plus the interest rate, F_t.

The two return components, cash-flow news (N^{cf}) and expected-return news (N^{r}), are

[3] $B_t = B_{t-1} + X_t - D_t$–book equity this period equals to the book equity last period plus earnings less dividends of last period.

defined as follows[4],

$$N_t^{\mathrm{cf}} \equiv \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(e_{t+j} - f_{t+j}\right) + \kappa_t, \quad N_t^{\mathrm{r}} \equiv \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j}. \tag{2}$$

Therefore, the unexpected returns are decomposed into two components,

$$r_t - E_{t-1} r_t = N_t^{\mathrm{cf}} - N_t^{\mathrm{r}}. \tag{3}$$

According to equation (3), the unexpected-return variance is decomposed into three components.

$$\mathrm{var}(r_t - E_{t-1} r_t) = \mathrm{var}(N_t^{\mathrm{cf}}) + \mathrm{var}(N_t^{\mathrm{r}}) - 2\mathrm{cov}(N_t^{\mathrm{cf}}, N_t^{\mathrm{r}}), \tag{4}$$

The greater is the variance (or covariance) of any component on the right-hand side of equation (4.), the more important is this component in explaining the variance of the unexpected returns..

2.2 Estimation technology

This section briefly discusses the estimation methods in this paper. Following Campbell (1991) and Vuolteenaho (2002), we define a vector of state variables of the firm i at time t, $z_{i,t}$. Without loss of generosity, the first element of the $z_{i,t}$ is the firm's stock return, defined as market-adjusted log return. Other elements of the state variable $z_{i,t}$ are constructed by using firm's relevant accounting variables. An individual firm's state variables are assumed to follow a first-order[5] linear law:

$$z_{i,t} = \Gamma z_{i,t-1} + u_{i,t}. \tag{5}$$

[4]The approximation error of this return-news equation, $\kappa_t \equiv \Delta E_t k_{t-1}$, is the expected change in a constant-plus-error term. It can be ascribed to either of the cash-flow or expected-return term. Vuolteenaho (2002) claims that he checks both cases, and the results are not robust to the choice. In this paper, we only ascribe κ_t to the cash-flow news, shown in equation (2).

[5]The assumption that the VAR is first-order is not restrictive, since the higher order VAR can always be stacked into the first-order form as in Campbell and Shiller (1988a)

Same as in Vuolteenaho (2002), the VAR coefficient Γ is assumed to be constant, both over time and across firms. The error term $u_{i,t}$ is assumed to have a covariance matrix Σ and to be independent of everything known at time $t-1$.

In order to pick out the stock return from the vector $z_{i,t}$, one defines $e1' \equiv (1, 0, ..., 0)$, whose first element is one, and whose other elements are zeros. The first-order VAR system generates the simple multi-period forecasts of future returns:

$$E_t r_{i,t+j} = e1'\Gamma^j z_t. \tag{6}$$

It is straightforward that the expected-return news in equation (2) can be written as

$$\begin{aligned} N^{\mathrm{r}}_{i,t} &\equiv \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} = e1' \sum_{j=1}^{\infty} \rho^j \Gamma^j u_{i,t} \\ &= e1'\rho\Gamma(1-\rho\Gamma)^{-1} u_{i,t} \\ &= \lambda' u_{i,t} \end{aligned} \tag{7}$$

where $\lambda' \equiv e1'\rho\Gamma(1-\rho\Gamma)^{-1}$ is a nonlinear transformation of the coefficients in the first-order VAR equation. Cash-flow news can be, in turn, written as $(e1' + \lambda')u_{i,t}$.

The variance decomposition of unexpected returns can be computed directly from $u_{i,t}$. A compact formula can be obtained by using the innovation covariance matrix Σ in addition to the coefficient matrix Γ,

$$\begin{aligned} \mathrm{var}(N^{\mathrm{r}}) &= \lambda'\Sigma\lambda \\ \mathrm{var}(N^{\mathrm{cf}}) &= (e1' + \lambda')\Sigma(e1 + \lambda) \\ \mathrm{cov}(N^{\mathrm{r}}, N^{\mathrm{cf}}) &= \lambda'\Sigma(e1 + \lambda) \end{aligned} \tag{8}$$

3 Results

3.1 Basic Data

We obtain the US data from the CRSP-COMPUSTAT intersection, 1954 to 2006. Monthly data about stock prices, number of shares outstanding, dividends, and returns for NYSE, AMEX, and NASDAQ stocks is obtained from the Center for Research in Security Prices (CRSP) monthly file. Risk-free rates are one month T-Bill returns also from CRSP. The relevant accounting data is from COMPUSTAT annual research file. Our international return and accounting data is from WorldScope/DataStream. All variables are then constructed at annual frequency from the monthly data because all analysis is done at annual frequency.

3.2 US Results

Table 1 shows the WLS estimates for the first-order VAR for US firms from the period from 1954 to 2006. In the estimation of the VAR model in equation (5), we use the ordinary least squares (OLS) regression. In practice, we run three pooled regressions of one left-hand-side variable on all right-hand-side variables. The state variables are market-adjusted log stock return, log book-to-market, and log GAAP[6] ROE. As we can see from the table, expected return is positively related to the return, book-to-market, and profitability of the last period. Expected profitability is high when the return and profitability of the last period are high, and when the book-to-market ratio is low. Expected book-to-market is primarily explained by the book-to-market ratio of last period. After 11 more years of data being added, these results are consistent with those for period of 1954 to 1996 in Vuolteenaho (2002).

The variance decomposition implied by the short VAR is shown in table 2. We calculate these numbers by using equation (8). The estimates of Γ and Σ matrices needed in equation (8) are taken from the panels in table 1. The four numbers on the left-hand-side of each panel are from the covariance matrix of the two news components, cash-flow news and

[6] Generally Accepted Accounting Principles.

expected-return news. The two numbers on the right-hand-side are the correlation between expected-return and cash-flow news and the ratio of expected-return-news variance to total unexpected-return variance [7]. In table 2, the variance of the expected-return news (0.0114 or standard deviation 11%) is less than one tenth of the variance of the cash-flow news (0.1650 or standard deviation 40%). The expected-return news is dominated by the cash-flow news. In fact, the ratio of expected-return news to the total unexpected-return variance is 0.0668 with the standard error of 0.0265. This result is consistent with Vuolteenaho (2002). we repeat the similar return decomposition technique for 28 other countries on a country-by-country basis. Our focus is how the relative importance of the expected-return news and cash-flow news changes with a country-level measure of earnings management.

3.3 An International Analysis

Table 3 shows the number of stock-year observations in each of the 28 foreign countries and each year. Including the US, our data covers 29 countries (excluding the US). Although we have data from 1954 to 2006 for the US, our sample period of international data is from 1982 to 2006 and there are differences across countries in terms of coverage. For each country in our sample, we repeat the analysis as in section 3.2.

The results for all 28 countries as well as the results for the US are summarized in table 4. In panel A of this table, the first five statistics for each country are from the return decomposition. These statistics include Var(ur), the variance of unexpected stock return, Var(Nr), the variance of expected-return news, Var(Ncf), the variance of cash-flow news, Cor(Nr,Ncf), the correlation between two news components, and $\frac{\text{Var(Nr)}}{\text{Var(ur)}}$, the ratio of variance of cash-flow news to variance of unexpected stock return. The last two columns in panel A of this table are the earnings management score constructed by Leuz et al. (2003), EM, and the rank of countries based on earnings management score, EM rank. The earnings

[7] The ρ value used in table 2 is 0.967. This ρ value is the same as what Vuolteenaho (2002) uses. The results are not sensitive to the choice of ρ if $\rho \geq 0.95$. If firms do not pay any dividends, then ρ is equal to one. As long as firms pay dividends, ρ is less than one.

management score measure the extent to which firms manage their earnings. The higher the score for a country, the more extensive the earnings management and the more opaque the information environment in a country.

Panel B and C of table 4 show how the five statistics in panel A change with EM and EM rank. Panel B shows the regression of each of the five statistics on EM and EM rank. The variance of unexpected stock returns is significantly smaller for countries with more earnings management. The variance of cash-flow news also decreases with EM and EM rank. In contrast, neither the variance of expected-return news nor the correlation between two news components significantly changes with the earnings management. By using equation 4, we decompose the variance of unexpected return to three components, the variance of expected-return news, the variance of expected-return news, and the correlation between the two news components. Therefore, the reduction of unexpected-return variance in more opaque countries is due to the reduction of cash-flow news in those countries. Furthermore, when we regress the measure of importance of expected-return news in explaining unexpected return variation, $\frac{\text{Var(Nr)}}{\text{Var(ur)}}$, on EM or EM rank, we see a significantly positive relation. This means that the expected-return news becomes more important, or the cash-flow news becomes less important in countries with more earnings management.

4 Conclusion

We have examined for the first time the evidence of return decomposition in an international setting. Variation in country characteristics offers great opportunities to understand the drivers of unexpected stock return. One important dimension that international data provides (but domestic data can not) is the difference across countries in terms of earning management. After updating the results of Vuolteenaho (2002) with US firms in the period of 1954 to 1996 and confirming the dominance of cash-flow news over expected-return news in explaining the variance of unexpected stock returns, we then decompose stock returns for

28 other countries. We find that the expected-return news is more important in terms of explaining unexpected-return variance in more opaque countries. This is consistent with the story that in a more opaque information environment, insiders of the firms may absorb part of the variation in the cash flow. If variations in the riskiness of firms' projects stay the same across countries, cash-flow news is less important relative to the expected-return news in an opaque country than in a transparent one.

We can explore several potential avenues in the future. First, we can do a more complete analysis for more countries around the world when we have more data. Second, there are many other different but related country characteristics that we may consider, such as the investor protection, corporate governance, and the origin of law among others. Third, we may combine the return decomposition at the aggregate market level or at the aggregate portfolio level with the firm-level return decomposition, which would enable us to further decompose the news components into market-level news and firm-level idiosyncratic news.

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Table 1: **Short VAR for Market-adjusted Returns: the US, 1954 to 2006**
This table reports the parameter estimates for the short VAR in the period of 1954 to 2006. The model variables include the market-adjusted log stock return, $\tilde{r}$ (the first element of the state vector z) ; the market-adjusted log book-to-market ratio, $\tilde{\theta}$ (the second element); and the market-adjusted log profitability, $\tilde{e}$ (the third element). The parameters in the table correspond to the following system:

$$z_{i,t} = \Gamma z_{i,t-1} + u_{i,t}, \quad \Sigma = E(u_{i,t}u'_{i,t})$$

CRSP-COMPUSTAT intersection is the sample. The number of firm-years is 94,814. The estimates are shown in bold. The numbers in parentheses below the estimates are robust standard errors calculated by using the method of Rogers (1983, 1993), and the numbers in brackets are the robust standard errors computed by using the jackknife method of Shao and Rao (1993). For the innovation covariance matrix, Σ, only jackknife standard errors are shown. Estimation method is pooled ordinary-least-square (OLS). Weighted-least-square and Fama-MacBeth methods (unreported) produce similar numbers. The numbers are similar to those in Vuolteenaho (2002)

	Γ			Σ		
	$\tilde{r}_{t-1}$	$\tilde{\theta}_{t-1}$	$\tilde{e}_{t-1}$	$\tilde{r}_t$	$\tilde{\theta}_t$	$\tilde{e}_t$
$\tilde{r}_t$	**0.0589**	**0.0587**	**0.1010**	**0.1704**	**-0.0792**	**0.0232**
	(0.0238)	(0.0122)	(0.0334)			
	[0.0253]	[0.0128]	[0.0349]	[0.0150]	[0.0092]	[0.0030]
$\tilde{\theta}_t$	**-0.3021**	**0.7998**	**0.1186**	**-0.0792**	**0.1579**	**0.0202**
	(0.0191)	(0.0115)	(0.0369)			
	[0.0199]	[0.0120]	[0.0387]	[0.0092]	[0.0145]	[0.0023]
$\tilde{e}_t$	**0.1626**	**-0.0438**	**0.3855**	**0.0232**	**0.0202**	**0.0634**
	(0.0100)	(0.0050)	(0.0274)			
	[0.0106]	[0.0053]	[0.0286]	[0.0030]	[0.0023]	[0.0052]

Table 2: **Variance Decomposition of Market-adjusted Returns: the US, 1954 to 2006**
This table reports a variance decomposition of market-adjusted returns and other statistics based on equation (8) for US firms in the period of 1954 to 2007. The estimates of Γ and Σ matrices needed in equation (8) are taken from table 1. The four numbers on the left-hand-side of each panel are from the covariance matrix of the two news components, cash-flow news and expected-return news. The two numbers on the right-hand-side of each panel are the correlation between expected-return and cash-flow news, Cor(Nr,Ncf), and the ratio of expected-return-news variance to total unexpected-return variance, $\frac{\text{Var(Nr)}}{\text{Var(ur)}}$. The short VAR state vector used in table 1 includes market-adjusted log stock return, $\tilde{r}$, the market-adjusted log book-to-market ratio, $\tilde{\theta}$, and market-adjusted log profitability, $\tilde{e}$. The data sample is the CRSP-COMPUSTAT intersection. The estimates are shown in bold. The jackknife standard errors (j.s.e.) in brackets are calculated by using the jackknife method of Shao and Rao (1993).

Cov. matrix	Nr	Ncf		
Expected-return news (Nr)	**0.0114**	**0.0030**	Cor(Nr,Ncf)	**0.0692**
	[0.0045]	[0.0052]		[0.1229]
Cash-flow news (Ncf)	**0.0030**	**0.1650**	$\frac{\text{Var(Nr)}}{\text{Var(ur)}}$	**0.0668**
	[0.0052]	[0.0162]		[0.0265]

Table 3: **Distribution of Stock-year's by Country and Year for 28 Foreign Countries**

Country	Total	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Australia	4695	16	21	23	23	27	31	32	41	62	97	113	120	130	126	137	154	178	198	196	243	330	521	581	605	690
Austria	1009	9	9	9	11	12	15	24	29	36	40	46	53	56	60	62	63	66	65	63	59	53	45	41	42	41
Belgium	1813	14	16	17	20	22	25	35	70	73	85	89	90	92	95	97	96	88	88	93	109	112	102	96	97	92
Canada	10070	89	105	108	120	149	175	210	257	279	305	340	377	390	403	401	446	439	436	521	555	645	689	799	874	958
Denmark	2624	6	8	12	14	19	21	22	24	79	115	128	149	160	158	151	153	186	177	168	158	153	153	144	136	130
Finland	1141	.	.	.	.	.	.	.	2	16	28	34	36	36	38	53	66	77	81	85	93	99	101	102	101	93
France	7960	45	53	54	60	60	62	73	91	135	296	358	387	394	385	401	438	475	487	515	545	570	559	530	501	486
Germany	7490	43	53	53	66	73	79	90	112	199	244	292	315	333	374	365	392	448	435	446	530	557	531	511	483	466
Greece	1951	.	.	.	.	.	.	.	.	20	21	28	40	54	65	83	82	123	134	141	166	215	212	201	167	199
Hong Kong	3437	6	6	5	7	14	15	19	24	34	35	43	55	61	65	84	138	181	190	201	197	279	350	430	476	522
India	2896	.	.	.	.	.	.	.	.	.	.	3	15	99	134	140	182	182	197	192	189	247	274	287	348	407
Indonesia	1250	.	.	.	.	.	.	.	.	.	.	5	51	62	80	84	37	27	37	50	76	109	131	153	172	176
Ireland	698	7	7	10	7	9	16	19	27	30	36	40	38	35	35	35	39	43	40	43	34	28	32	32	27	29
Italy	3471	6	9	15	21	27	28	77	155	188	199	206	182	194	161	144	139	187	183	181	176	204	195	195	200	199
Japan	38712	56	193	236	282	382	559	688	718	832	1007	1374	1673	1729	1804	1876	1996	1956	2060	2603	2549	2504	2738	2908	2982	3007
Malaysia	4775	4	6	6	6	7	8	33	43	53	59	69	119	148	159	167	242	234	299	287	290	463	507	546	499	521
Netherlands	2424	20	20	21	24	25	26	32	71	86	102	131	140	142	141	148	148	162	149	144	133	128	115	112	103	101
Norway	1579	2	2	2	2	7	7	11	26	36	51	61	65	77	78	86	109	129	115	117	98	100	93	106	98	101
Pakistan	643	.	.	.	.	.	.	.	.	.	.	.	1	14	31	33	35	34	46	51	48	58	65	74	77	76
Philippines	861	.	.	.	.	.	.	.	.	2	2	5	13	16	31	33	57	64	69	67	70	80	78	89	92	93
Portugal	787	.	.	.	.	.	.	.	.	22	36	38	41	45	48	53	56	74	65	52	46	48	42	42	42	37
Singapore	2972	12	14	13	17	19	23	25	32	38	47	51	83	93	97	117	160	161	175	169	168	227	263	300	315	353
South Africa	2308	11	17	19	21	21	25	29	44	48	58	93	96	101	115	114	106	94	105	180	191	172	167	169	158	154
Spain	1667	.	.	.	.	.	.	2	40	51	74	81	83	94	100	97	109	102	98	103	108	107	108	111	101	98
Sweden	2461	.	1	6	9	11	11	14	18	47	66	78	95	114	126	137	148	157	161	160	159	180	176	199	203	185
Taiwan	4668	.	.	.	.	.	.	.	.	3	3	3	17	21	44	101	191	196	209	197	236	342	614	786	834	871
Thailand	2565	.	.	.	.	.	.	.	1	5	4	17	60	116	174	190	161	141	170	160	169	233	238	237	240	249
UK	15677	109	123	128	137	193	242	287	552	747	796	835	869	874	860	896	867	890	864	800	755	767	744	789	767	786
Total	132604	455	663	737	847	1077	1368	1722	2377	3121	3806	4561	5263	5680	5987	6285	6810	7094	7333	7985	8150	9010	9843	10570	10740	11120

Table 4: **News Variances and Variance-ratios by Country**

In panel A, the first five statistics for each country are Var(ur), the variance of unexpected stock return, Var(Nr), the variance of expected-return news, Var(Ncf), the variance of cash-flow news, Cor(Nr,Ncf), the correlation between two news components, and $\frac{\text{Var(Nr)}}{\text{Var(ur)}}$, the ratio of variance of cash-flow news to variance of unexpected stock return. The last two columns in this table are the earnings management score constructed by Leuz et al. (2003), EM and the rank of countries based on earnings management score, EM rank. Panel B shows the regression coefficients of each of the five statistics on EM and EM rank.

Panel A

Country	Var(ur)	Var(Nr)	Var(Ncf)	Cor(Nr,Ncf)	$\frac{\text{Var(Nr)}}{\text{Var(ur)}}$	EM	EM rank
Australia	**0.210**	**0.006**	**0.219**	**0.210**	**0.029**	**4.8**	**2**
	[0.018]	[0.005]	[0.029]	[0.280]	[0.028]		
Austria	**0.098**	**0.017**	**0.090**	**0.121**	**0.172**	**28.3**	**28**
	[0.011]	[0.008]	[0.016]	[0.186]	[0.079]		
Belgium	**0.072**	**0.013**	**0.081**	**0.343**	**0.186**	**19.5**	**20**
	[0.006]	[0.004]	[0.012]	[0.134]	[0.062]		
Canada	**0.186**	**0.008**	**0.196**	**0.223**	**0.043**	**5.3**	**4**
	[0.014]	[0.006]	[0.020]	[0.170]	[0.030]		
Denmark	**0.104**	**0.010**	**0.110**	**0.241**	**0.098**	**16.0**	**13**
	[0.007]	[0.006]	[0.018]	[0.174]	[0.055]		
Finland	**0.110**	**0.012**	**0.097**	**-0.021**	**0.105**	**12.0**	**10**
	[0.011]	[0.011]	[0.026]	[0.329]	[0.100]		
France	**0.127**	**0.013**	**0.136**	**0.256**	**0.099**	**13.5**	**11**
	[0.011]	[0.007]	[0.015]	[0.144]	[0.052]		
Germany	**0.132**	**0.010**	**0.160**	**0.484**	**0.073**	**21.5**	**23**
	[0.020]	[0.005]	[0.041]	[0.292]	[0.037]		
Greece	**0.168**	**0.019**	**0.139**	**-0.090**	**0.116**	**28.3**	**28**
	[0.015]	[0.007]	[0.028]	[0.237]	[0.042]		
Hong Kong	**0.222**	**0.031**	**0.195**	**0.025**	**0.139**	**19.5**	**20**
	[0.014]	[0.010]	[0.027]	[0.198]	[0.049]		
India	**0.180**	**0.009**	**0.150**	**-0.282**	**0.050**	**19.1**	**19**
	[0.012]	[0.011]	[0.027]	[0.208]	[0.062]		
Indonesia	**0.168**	**0.010**	**0.143**	**-0.192**	**0.061**	**18.3**	**16**
	[0.024]	[0.009]	[0.023]	[0.243]	[0.049]		
Ireland	**0.133**	**0.005**	**0.184**	**0.909**	**0.040**	**5.1**	**3**
	[0.017]	[0.004]	[0.040]	[0.169]	[0.028]		
Italy	**0.083**	**0.018**	**0.096**	**0.365**	**0.214**	**24.8**	**26**
	[0.005]	[0.009]	[0.020]	[0.222]	[0.106]		
Japan	**0.085**	**0.019**	**0.056**	**-0.158**	**0.224**	**20.5**	**22**
	[0.007]	[0.004]	[0.006]	[0.068]	[0.046]		
Malaysia	**0.130**	**0.010**	**0.124**	**0.066**	**0.078**	**14.8**	**12**

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Table 4 – continued from previous page

Country	Var(ur)	Var(Nr)	Var(Ncf)	Cor(Nr,Ncf)	$\frac{\text{Var(Nr)}}{\text{Var(ur)}}$	EM	EM rank
	[0.017]	[0.005]	[0.016]	[0.109]	[0.031]		
Netherlands	**0.104**	**0.006**	**0.110**	**0.228**	**0.055**	**16.5**	**14**
	[0.009]	[0.006]	[0.017]	[0.420]	[0.053]		
Norway	**0.135**	**0.022**	**0.117**	**0.034**	**0.160**	**5.8**	**6**
	[0.011]	[0.010]	[0.016]	[0.132]	[0.076]		
Pakistan	**0.128**	**0.005**	**0.159**	**0.658**	**0.036**	**17.8**	**15**
	[0.014]	[0.007]	[0.050]	[0.482]	[0.054]		
Philippines	**0.218**	**0.017**	**0.233**	**0.253**	**0.078**	**8.8**	**9**
	[0.022]	[0.010]	[0.055]	[0.408]	[0.044]		
Portugal	**0.122**	**0.011**	**0.113**	**0.038**	**0.094**	**25.1**	**27**
	[0.009]	[0.007]	[0.017]	[0.175]	[0.052]		
Singapore	**0.131**	**0.015**	**0.132**	**0.177**	**0.111**	**21.6**	**24**
	[0.012]	[0.009]	[0.018]	[0.222]	[0.074]		
South Africa	**0.187**	**0.016**	**0.156**	**-0.151**	**0.086**	**5.6**	**5**
	[0.022]	[0.007]	[0.024]	[0.120]	[0.036]		
Spain	**0.087**	**0.004**	**0.099**	**0.391**	**0.049**	**18.6**	**18**
	[0.008]	[0.002]	[0.017]	[0.340]	[0.024]		
Sweden	**0.145**	**0.021**	**0.149**	**0.216**	**0.143**	**6.8**	**7**
	[0.017]	[0.019]	[0.029]	[0.300]	[0.128]		
Taiwan	**0.138**	**0.012**	**0.159**	**0.374**	**0.089**	**22.5**	**25**
	[0.007]	[0.006]	[0.039]	[0.330]	[0.044]		
Thailand	**0.200**	**0.031**	**0.149**	**-0.141**	**0.157**	**18.3**	**16**
	[0.039]	[0.016]	[0.028]	[0.171]	[0.061]		
UK	**0.140**	**0.009**	**0.150**	**0.261**	**0.064**	**7.0**	**8**
	[0.013]	[0.005]	[0.020]	[0.256]	[0.039]		
US	**0.170**	**0.011**	**0.165**	**0.069**	**0.067**	**2.0**	**1**
	[0.015]	[0.004]	[0.016]	[0.123]	[0.027]		
Panel B: Regressions of decomposition statistics on EM and EM rank							
on EM	-0.002	0.000	-0.003	-0.004	0.003		
t-stat	-2.177	1.010	-2.968	-0.669	2.288		
on EM rank	-0.002	0.000	-0.002	-0.004	0.003		
t-stat	-2.134	1.241	-2.855	-0.656	2.629		